

(12) UK Patent Application (19) GB (11) 2 345 598 (13) A

(43) Date of A Publication 12.07.2000

(21) Application No 9927560.4

(22) Date of Filing 23.11.1999

(30) Priority Data

(31) 98050796 (32) 25.11.1998 (33) KR

(71) Applicant(s)

Samsung Electronics Co., Ltd.
(Incorporated in the Republic of Korea)
416 Maetan-dong, Paldal-gu, Suwon-city,
Kyungki-do, Republic of Korea

(72) Inventor(s)

Sung-Lyong Lee

(74) Agent and/or Address for Service

Appleyard Lees
15 Clare Road, HALIFAX, West Yorkshire, HX1 2HY,
United Kingdom

(51) INT CL⁷

H03J 7/18

(52) UK CL (Edition R)

H3Q QCD Q101 Q103 Q200 Q4C Q6R4

(56) Documents Cited

GB 2325363 A EP 0579408 A1

(58) Field of Search

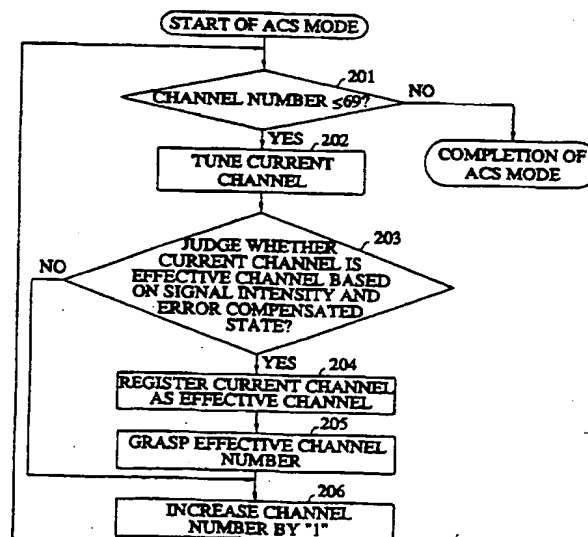
UK CL (Edition R) H3Q QBSS QCD QDRP QDRS QDRX
INT CL⁷ H03J 7/18 , H04B 1/16 , H04N 5/44 5/50
ONLINE: WPI, EPODOC, PAJ

(54) Abstract Title

A digital broadcasting receiver and automatic channel searching method wherein channels are tuned sequentially effective channels being classified

(57) An automatic channel search method and a digital broadcasting receiver adopting the same are provided in which effective channels are more swiftly and reliably searched and channel configuration is performed with respect to each single network in a multi-network. At the time when a set is initially installed and then power is turned on, or a user selects an automatic channel searching mode in the case that a broadcasting service area is altered, the entire channels are sequentially tuned and effective channels are found based on the average of the signal intensity of each tuned channel and the error compensated state of the signal, to then be registered. Then, only the registered effective channels are sequentially tuned and a broadcasting signal of each tuned effective channel is parsed and classified into various necessary information. Thus, only the effective channels are parsed without parsing the entire channels, thereby saving unnecessary time, which provides an effect of swiftly processing a channel configuration of each single network with respect to a multi-network in the European digital TV.

FIG. 2



GB 2 345 598 A

METHOD FOR AUTOMATICALLY SEARCHING CHANNELS IN DIGITAL
BROADCASTING RECEIVER AND DIGITAL BROADCASTING RECEIVER
ADOPTING THE SAME

5 The present invention relates to an automatic channel
search for channel configuration of each network, and more
particularly, to an automatic channel search method for
automatically searching effective channels more reliably
and stably and a digital broadcasting receiver performing
10 the same.

When a broadcasting receiver such as a TV set is purchased
and initially installed or removed, an automatic channel
searching (ACS) mode should be performed for grasp of
15 network status. When power is initially applied to the
broadcasting receiver, or a user selects the ACS mode in
the case that the broadcasting service area of the
broadcasting receiver is altered, effective channels are
found to perform channel configuration with respect to a
20 network of a corresponding area of service.

As the number of channels increases due to start of
digital broadcasting service, it is required that ACS mode
should be more swiftly performed.

25 With a view to solve or reduce the above problems, it is
an aim of embodiments of the present invention to provide
a method for implementing an automatic channel searching
(ACS) mode more swiftly and reliably in a digital
broadcasting receiver for receiving a digital broadcasting
30 to allow viewers to watch the digital broadcasting, and a
digital broadcasting receiver adopting the same.

signal intensity exceeds the reference value and the signal is in the error compensated state.

In another aspect of the invention, there is also provided
5 a digital broadcasting receiver comprising: a tuner for
tuning an orthogonal frequency division multiplexing
(OFDM) signal which is broadcast and received; an OFDM
demodulator for demodulating the OFDM signal tuned in the
tuner and obtaining intensity of the signal; a forward
10 error correction (FEC) unit for error correcting the
signal demodulated in the OFDM demodulator; a controller
for controlling the tuner to sequentially tune the entire
channel bands from the first channel and the last channels
at the initial time when an automatic channel searching
15 (ACS) mode is executed, and controlling the tuner to
sequentially tune effective channels from the first
effective channel to the last effective channel, in order
to search the effective channels in which broadcasting
signals exist, parse the searched effective channels and
20 classify the parsed signal into various necessary
information, based on the intensity of the signal obtained
in the OFDM demodulator and the error compensated state in
the FEC unit; and a memory unit for storing the effective
channels searched in the controller.

25

Preferably, said memory unit pre-stores a particular value
in a predefined address position for performance of an ACS
mode, and wherein said controller judges whether or not an
ACS mode is executed, on the basis of the value stored in
30 the position indicated by a predefined address in said
memory unit when power is turned on at the initial time of
installation of a set or a user selects an ACS mode, and

effective channels obtained after performance of the ACS mode. Meanwhile, the digital TV of Figure 1 also includes a central processing unit (CPU) 14 which is connected to each component block via an I²C bus, for controlling the entire operations of each component block for performing the ACS mode. The CPU 14 finds effective channels based on the intensity of the tuned signal which is input via the OFDM demodulator 12 and the error compensated state of the FEC unit 13 and registers the found effective channels in the memory unit 15. The operation of performance of the ACS mode in a digital TV of Figure 1 having the above configuration will be described below with reference to Figure 2.

When a TV set is initially installed and power is turned on, or a user selects an ACS mode in the case that a broadcasting service area has been altered, the CPU 14 reads out a value stored in a corresponding position of the NVRAM 15 which is indicated by a predefined particular address. The CPU 14 judges whether or not an ACS mode will be performed based on the read value. For example, the CPU 14 performs the ACS mode in the case that the read value corresponding to the particular address is the same as that defined in the following Table 1.

Table 1

particular address	stored value
0X00	0XFF
0X40	0XFF
0X80	0XFF

number is smaller than or equal to the last channel number "69" in order to judge if the entire channels are searched (step 201). If the current channel number is larger than the last channel number "69" in the result of the judgement of step 201, the CPU 14 judges that the entire channels have been searched and completes the ACS mode. Conversely, if the current channel number is smaller than or equal to the last channel number "69" in the result of the judgement of step 201, the CPU 14 judges that the entire channels have not been searched and controls the tuner 11 to tune the channel signal corresponding to the current channel number (step 202). When the tuner 11 tunes the corresponding channel signal in step 202, the CPU 14 judges whether the current channel is an effective channel in which a broadcasting signal exists (step 203). In step 203, the CPU 14 judges whether the current channel is an effective channel based on the average of the intensities of the tuned signal obtained in the OFDM demodulator 12 and the error compensated state in the FEC unit 13. That is, the CPU 14 judges that the current channel is an effective channel if the average of the signal intensities exceeds 40% and the error compensated state is formed in the FEC unit 13, that is, a lock is formed. If the current channel is the effective channel, the CPU 14 registers the current channel as the last channel in the NVRAM 15 (step 204). In this case, whenever the CPU 14 registers the current channel as the last channel, the CPU 14 increases the number of the effective channel by "1" to then grasp the effective channel number (step 205). Then, the current channel number is increased by "1" to alter the channel number (step 206), and repeatedly performs the steps from step 201 in order to search the effective channels from the

As described above, the automatic channel search method and the digital broadcasting receiver according to the present invention searches the entire channels in the case that a set is initially installed or a broadcasting service area is changed, to find only effective channels via which broadcasting signal exist, and then parses various necessary information with respect to the found effective channels. Accordingly, a classification with respect to a multi-network can be carried out to thereby speedily process a channel configuration with respect to a single network.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

CLAIMS

1. An automatic channel searching (ACS) method for automatically searching channels in a digital broadcasting receiver, the ACS method comprising:

(a) sequentially turning the entire channels from the first channel to the last channel;

(b) finding effective channels based on the intensity and the error compensated state of the signal tuned in step (a);

(c) sequentially tuning the effective channels found in step (b) from the first effective channel to the last effective channel; and

(d) parsing the signal tuned in step (c) to classify the tuned signal into various necessary information.

2. The ACS method according to claim 1, wherein said ACS is performed when said broadcasting receiver is initially installed or a user selects an ACS mode.

3. The ACS method according to claim 1 or 2, wherein said step (b) comprises the sub-steps of:

(b1) demodulating and error correcting the signal of the tuned current channel, thereby obtaining an intensity of the signal;

(b2) obtaining an average of the signal intensity obtained in step (b1);

channel searching (ACS) mode is executed, and controlling the tuner to sequentially tune effective channels from the first effective channel to the last effective channel, in order to search the effective channels in which
5 broadcasting signals exist, parse the searched effective channels and classify the parsed signal into various necessary information, based on the intensity of the signal obtained in the OFDM demodulator and the error compensated state in the FEC unit; and

10

a memory unit for storing the effective channels searched in the controller.

6. The digital broadcasting receiver according to claim
15 5, wherein said memory unit pre-stores a particular value in a predefined address position for performance of an ACS mode, and wherein said controller judges whether or not an ACS mode is executed, on the basis of the value stored in the position indicated by a predefined address in said
20 memory unit when power is turned on at the initial time of installation of a set or a user selects an ACS mode, and alters the stored value at the time when the ACS mode is completed.

25 7. The digital broadcasting receiver according to claim 6, wherein said controller obtains an average with respect to the signal intensity of the current channel obtained in said OFDM demodulator, and recognizes that the current channel is an effective channel if the average exceeds a
30 reference value and the signal is error compensated in said FEC unit to thereby register the current channel in said memory unit.



Application No: GB 9927560.4
Claims searched: 1-9

Examiner: Paul Jefferies
Date of search: 3 May 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): H3Q (QCD, QDRS, QDRP, QDRX, QBSS)
Int Cl (Ed.7): H04B 1/16; H03J 7/18; H04N 5/44, 5/50
Other: ONLINE: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2325363 A (MITSUBISHI) See Summary, pages 3-4.	
A	EP 0579408 A1 (GENERAL INSTRUMENT) See	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.